

1 WHAT IS CLAIMED IS:

1. A method for analyzing performance of a wireless location system comprising the steps of:

5 storing data related to location equipment, wireless infrastructure, handsets, terrain map, and morphology map;

generating a site radial file for path loss and time/angle error based on the stored terrain and morphology maps;

10 computing a multi-site forward and a multi-site reverse link signal strength map for determining coverage of the location system;

generating a multi-site margin/error map from the computed multi-site forward and reverse link signal strength map and the stored data;

15 generating a location error estimate map from covariance at each point in the margin/error map; and

generating an error estimate map for the location system.

20 2. The method of claim 1, further comprising the step of displaying the generated error estimate map.

3. The method of claim 1, further comprising the step of storing the generated error estimate data.

25 4. The method of claim 1, wherein the step of generating a site radial file for path loss and time/angle error comprises the steps of:

extracting number of radials per each sector of the site;

extracting number of points for each radial;

30 computing 4/3 earth altitudes;

computing propagation model to generate a path loss including effects of diffraction and antenna height;

computing loss due to antenna pattern; and

computing angle/time errors.

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1 5. The method of claim 1, wherein the multi-site map for path loss includes at each point, path loss for the best wireless server and error data for a site with highest received signals.

5 6. The method of claim 1, further comprising the step of converting the generated radial file to a cluster map for path loss and time/angle error.

10 7. The method of claim 6, wherein the step of converting comprises the steps of:

 determining a box map dimensions to fit the radial signal file;

 generating a signal map entry for each latitude and longitude in the box map; and

 storing path loss and error in the box map.

15 8. The method of claim 1, wherein the step of computing a multi-site forward and a reverse link signal strength map comprises the steps of:

 invoking stored terrain information;

 selecting a stored propagation model from a plurality of stored propagation models;

 computing a forward link propagation loss; and

 determining a likely server for a given location.

20 9. The method of claim 1, further comprising the step of computing a multi-site RX power map.

30 10. The method of claim 8, wherein the step of computing a multi-site RX power map comprises the steps of:

 using a window of received signal strength on the reverse link for setting a mobile unit's transmit power;

 generating the mobile unit Tx power map.; and

1 using the generated mobile unit Tx power map for generating
a multi-site RX power map.

5 11. The method of claim 1, wherein the step of computing
a multi-site forward and a reverse link signal strength map
comprises the step of selecting a location determination
algorithm from a plurality of stored location determination
10 algorithms, wherein inputs to the selected location determination
algorithm includes one or more of terrain information, location
and heights of mobile receiver; location and heights of fixed
receiver, land use, major road structures, and peculiar obstacles
defined in the area.

15 12. The method of claim 1, wherein the wireless
infrastructure includes one or more of location system type,
location system name; unit type; location receivers' antenna
category; location system antenna locations; antenna type; number
of antenna units at a given installation; location system antenna
20 elevation; location system antenna height; and cabling losses.

25 13. The method of claim 1, wherein the wireless
infrastructure includes one or more of air interface type; cell
site locations; site elevation; site height; Number of sectors;
antenna gain TX and RX; downtilt; number of channels;
control/signaling and voice channel assignments; transmit powers;
and power control window upper and lower limits.

30 14. The method of claim 1, further comprising the step of
editing the stored morphology map.

35 15. The method of claim 1, further comprising the steps of
reading, maintaining, and displaying one or more of interstate
roads, major roads, and secondary roads.

1 16. The method of claim 1, further comprising the step of performing sensitivity analysis by adjusting a parameter.

5 17. The method of claim 1, further comprising the steps of generating an output in form of one or more of average errors, RMS errors, number and identity of location receivers, and coverage availability.

10 18. The method of claim 1, further comprising the step of storing in a database information specific to a location technology including one or more of type of technology; antenna types; receiver sensitivities data; receiver noise data; receiver bandwidth; integration time; known receiver biases; receiver jitter; transfer function; presence of quality indicator's at receiver or receiver type; and quality indicators computation.

15 19. The method of claim 1, further comprising the step of importing data from an outside database.

20 20. A system for performance analysis of a location system comprising:

25 means for generating a radial model and a radial map including a plurality of radial paths for a site from a stored raster map;

means for selecting a propagation model from a stored plurality of propagation models for predicting a path loss along each radial path;

30 at each point along a radial path, means for predicting accumulated angular errors and time delay errors; and

means for generating an error estimate from the path loss and the accumulated angular errors and time delay errors.

35 21. The system of claim 20, further comprising means for displaying the generated error estimate map.

1 22. The system of claim 20, further comprising means for
storing the generated error estimate data.

5 23. The system of claim 20, further comprising means for
generating a location error estimate map.

 24. The system of claim 20, wherein the means for
generating a radial file comprises:

10 means for extracting number of radials per each sector of
a site;

 means for extracting number of points for each radial;

 means for computing 4/3 earth altitudes;

15 means for computing a propagation model to generate a path
loss including effects of diffraction and antenna height;

 means for computing loss due to antenna pattern; and

 means for computing angle/time errors.

20 25. The system of claim 20, further comprising means for
converting the generated radial file to a cluster map for path
loss and time/angle error.

 26. The system of claim 20, further comprising means for
computing a multi-site RX power map.

25 27. The system of claim 26, wherein the means for computing
a multi-site RX power map comprises:

 means for using a window of received signal strength on the
reverse link for setting a mobile unit's transmit power;

30 means for generating the mobile unit Tx power map.; and

 means for using the generated mobile unit Tx power map for
generating a multi-site RX power map.

35 28. The system of claim 20, further comprising means for
performing sensitivity analysis by adjusting a parameter.

1 29. The system of claim 20, further comprising means for
of generating an output in form of one or more of average errors,
RMS errors, number and identity of location receivers, and
5 coverage availability.

30. The system of claim 20, further comprising means for
importing data from an outside database.

10 31. A computer readable medium having stored thereon a set
of instructions including instruction for performance analysis
of a location system the instructions, when executed by a
computer, cause the computer to perform the steps of:

15 generating a radial model and a radial map including a
plurality of radial paths for a site from a stored raster map;

20 selecting a propagation model from a stored plurality of
propagation models for predicting a path loss along each radial
path;

25 at each point along a radial path, predicting accumulated
angular errors and time delay errors; and

30 generating an error estimate from the path loss and the
accumulated angular errors and time delay errors.